WISC eBOOK Version 4

Version 3 feedbacks

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SPE - Wellbore Positioning Technical Section

Version 3 Feedbacks

1. Figure 16 is scaled down too small – I have my glasses on, but miss the detail as given in the previous version (Fig. 7) where the diagram is physically larger. Action HAL

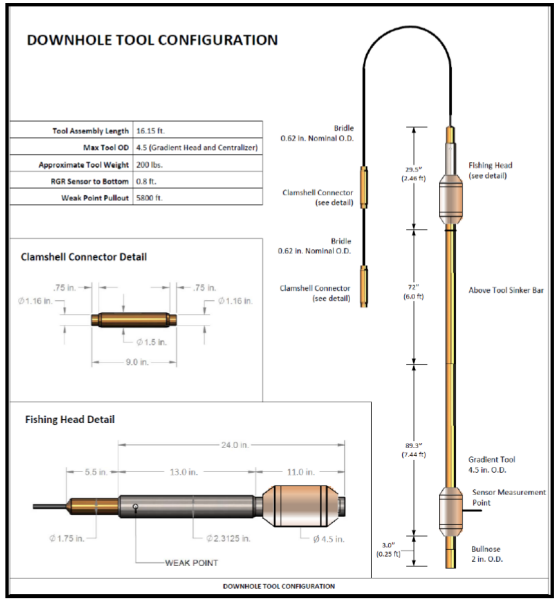

Figure 16—AI-AMR downhole tool configuration

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2. On the following comment, Section 3.2.5.1., can the AMR not be run on ANY 7-conductor wireline ? I am guessing that this comment does not need to mention SLB, HAL or BKR specifically , and should be directed more towards the technical specification of the 7-conductor wireline. I would imagine, but correct me otherwise, that this can be any 7-conductor wireline greater than (say) 15/32". But correct me as necessary

3.2.5.1 AMR Wireline Cable Requirements

The AMR kit is fully equipped to connect to a Halliburton, Baker Hughes, or Schlumberger 7 conductor logging unit. Connecting to other units is possible but will require detailed pre-planning to ensure the correct crossovers are sourced.

Action; HAL and SDI

- Should include the conductor specifications – smaller cable, the higher the resistance thus poorer injection performance for AMR. Heptacable is the most common used for AMR

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3. The diagram associated with Section 3.5 (Impact Angle of incidence, previous version Figure 10) should be referenced to Section 7.2.

Action; Benny

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4. Figure 21 (previous version Fig. 13) doesn't really say a lot. Perhaps a photograph would be more useful??

Action; Benny

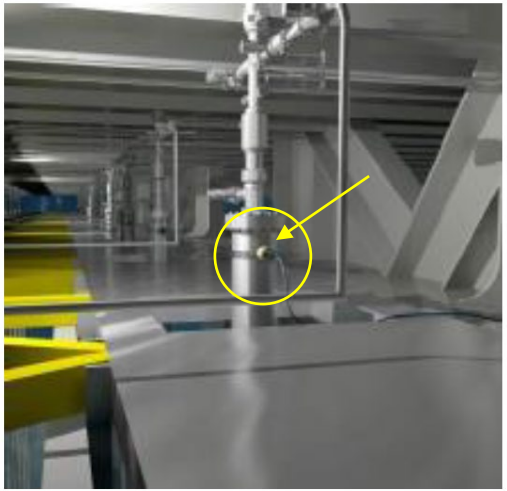

Figure 21—Illustration of sensors mounted on conductor of the well

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5. Section 7.2.1 & 7.2.2: how true/untrue is tare the values of 12m and 3m ? Surely this is heavily dependent on equipment specification and angle of incidence ? Maybe a comparison of vendor tool performance/specifications would be useful here ??

7.2.1 PMR

The high incidence angle for a PMR measurement means that the sensors are much farther from the target well than the bit. In the case above, it can increase the possibility of an unintended collision as a PMR determination at 12 meters may be of reduced accuracy, or in many cases unattainable.

7.2.2 AMR

The high incidence angle for an AMR measurement will mean that the excitation source will be farther away from the target well thus reducing the signal intensity. While this may cause some possible detection issues when at greater distances from the target well, in the case illustrated above, the ARM tool sensor is only 3 meters from the target well which reduces the signal intensity requirements for a ranging determination. Ranging with AMR at this well geometry does not pose an unintended collision risk.

Action; John, Nich, Benny

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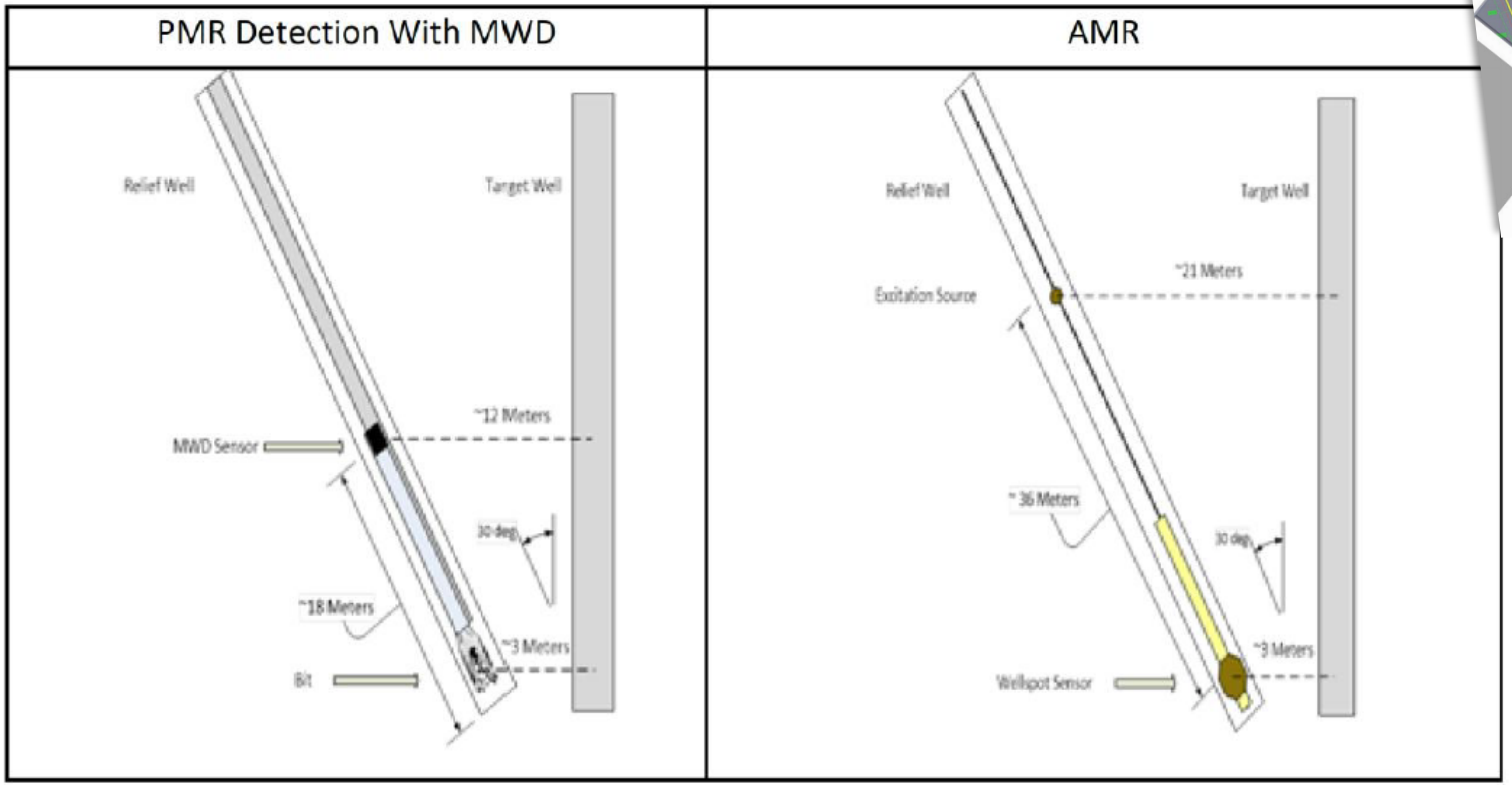

Figure 43—Illustration of PMR and AMR incident angle

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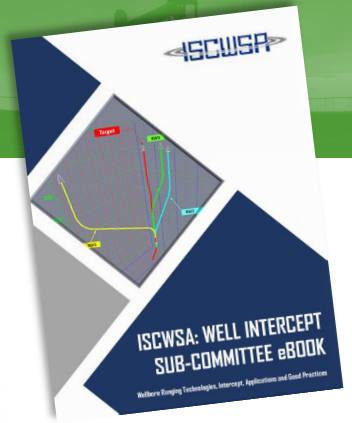

6. Figure 49 is somewhat unclear. It may be worth recreating the image so that the text elements are legible. Re-drawn ?

Action; Jamie

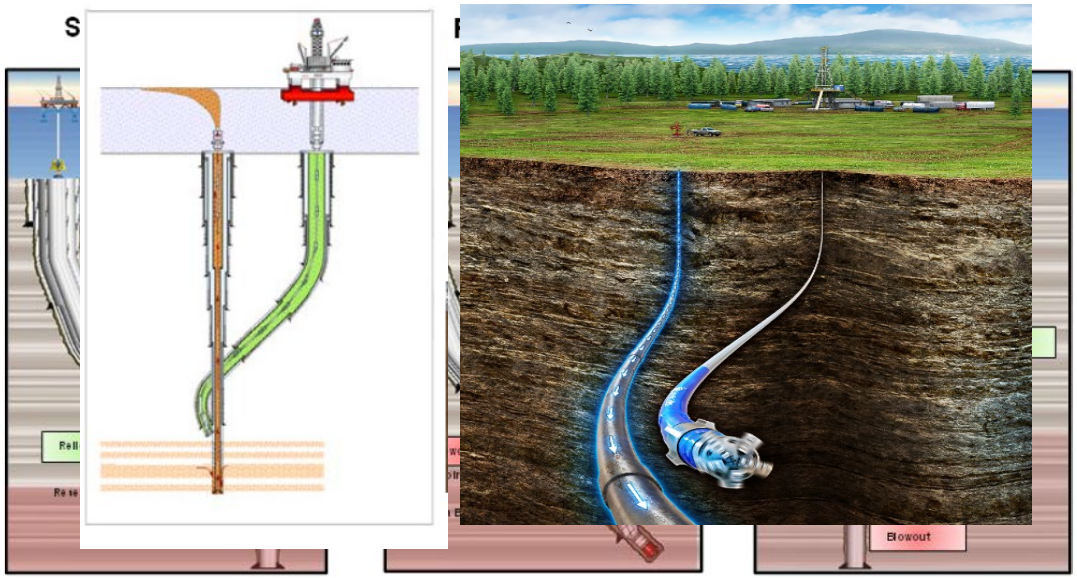

Figure 49—Various examples of relief well designs

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7. Figure 55 is difficult to read the axis and color legend box.

Action; Benny

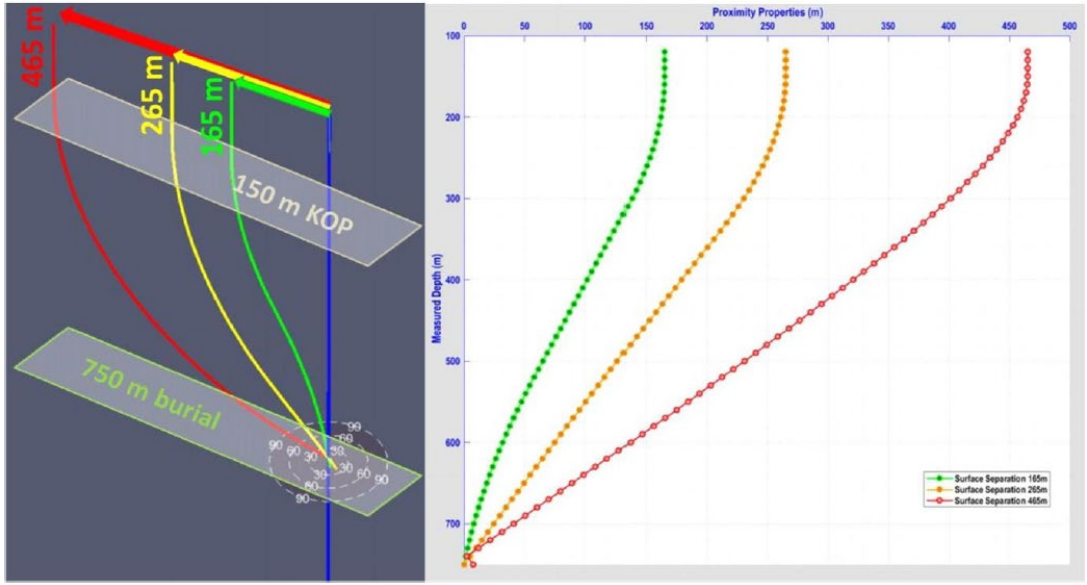

Figure 55 —Surface Location and Drilling Complexity Sensitivity Analysis

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8. Fig. 82 needs a little more explanation – I believe that his is a critical diagram. You know my views on 3-d uncertainty determination and depiction – the diagram assumes a “cone of uncertainty”, and refers to < +/-100 ft for the position of the casing shoe above the reservoir. The diagram illustrates GOM, and so we may assume 15k – 20k ft well depth. This gives an AHD accuracy of <+/- 100/20k = <0.5% for AHD (ignoring Az & Inc.) which is the limit of what is achievable using strapped pipe and no correction. It is important to mention this (in my opinion) because it sets that standard for AHD accuracy that might be applicable. (Lucky drillers ! If so, they don't have to do anything different and SLB can log down !). Now, if anything more accurate than this is needed (?? what does “<” mean ??), THEN specific AHD measurement accuracy specifications have to be taken into consideration in order to achieve the then higher AHD accuracy requirements.

Action: Harald then to Jamie

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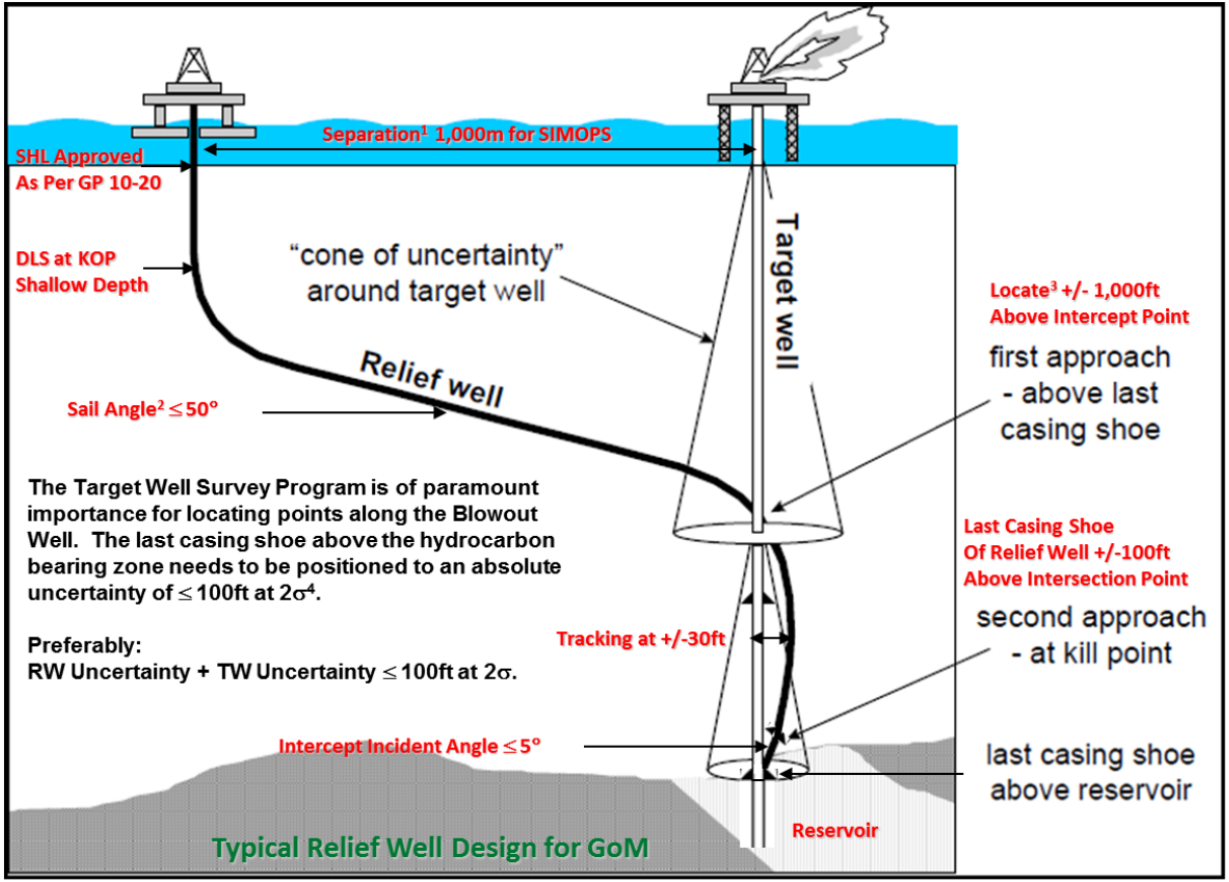

Figure 82—A typical example of relief well trajectory in GOM

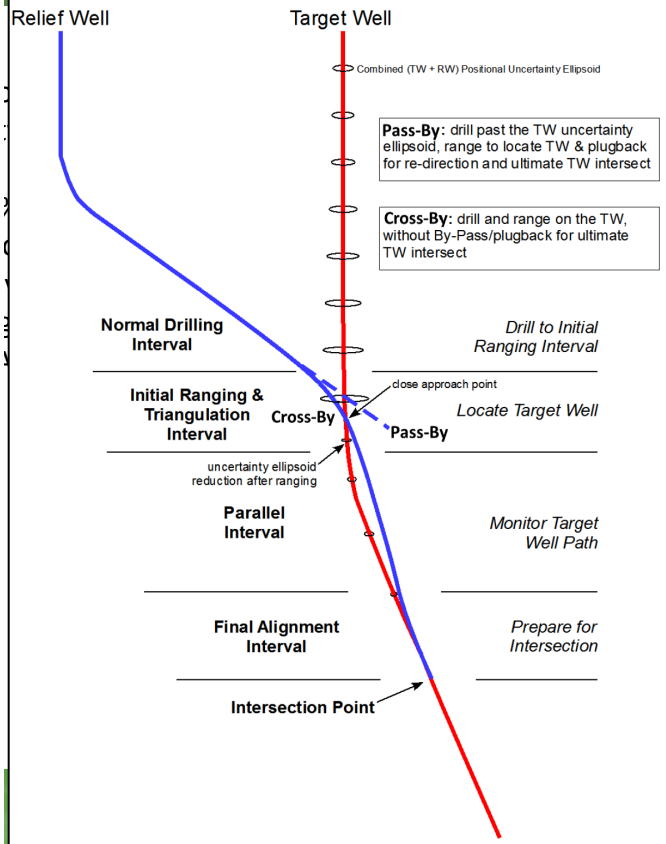

Figure 81—A diagram depicting a general breakdown of relief well elements

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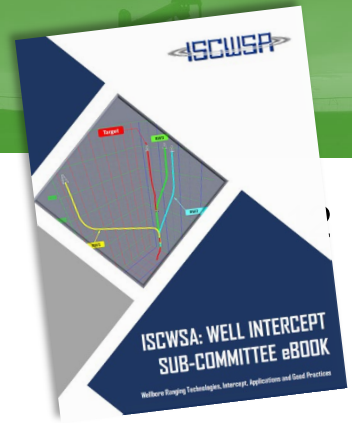

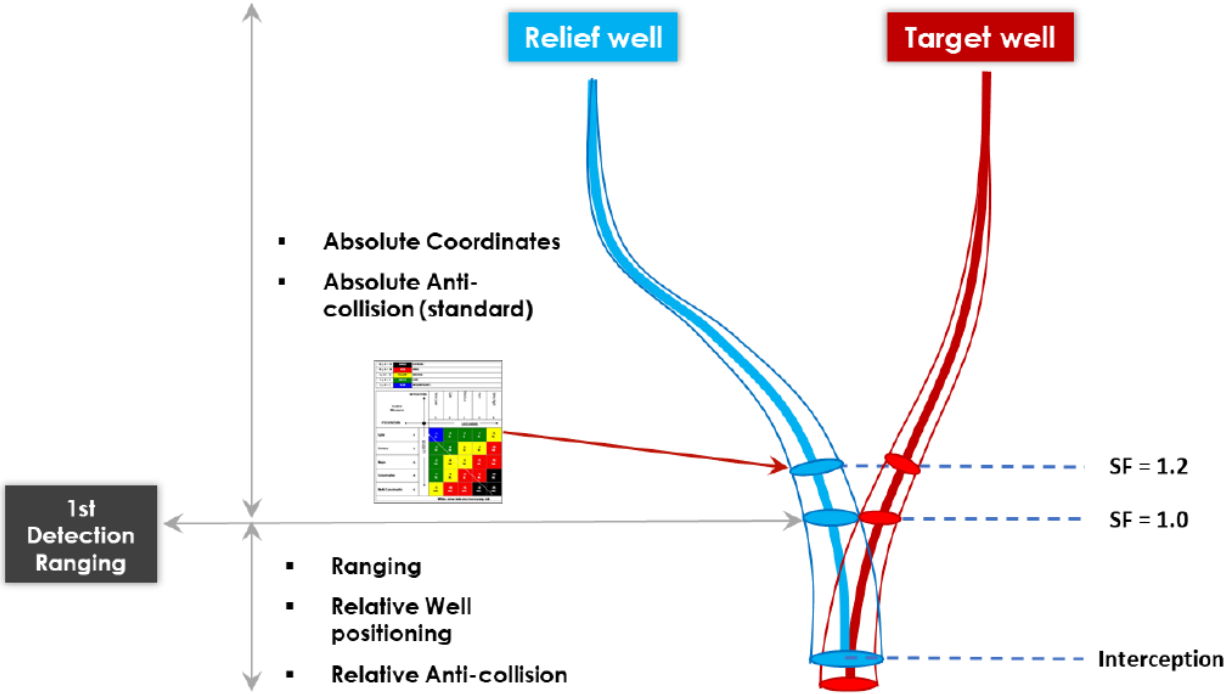

Figure 51—The relief well planning requires an advanced and optimum survey program to obtain the best wellbore position possible. This, along with HARC, determines the safest operation envelope following the collision avoidance standard, such as a separation factor of 1.2, and ensures the risk of early interception shall be managed to non HES prior to the first ranging run.

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9. This brings me to my favorite subject, and there is no mention of AHD data accuracy at all in the text. A while ago I spoke with Roger about this and we were fixing on doing something – and never did. Now, when ranging the 3-d well bore positioning itself loses importance as soon as the ranging device(s) pick up the target well, so AHD is then essentially irrelevant as it is then a relative distance/position game. But – that does not remove the need for quantification of the AHD accuracy. As Figure 82 shows, the 3-d depiction of the relative positions to the wellbores to each other, to other wells and to the reservoir/geologies does have implications. While I agree that AHD is not a main issue here, there is a discussion of 3-d positioning so I do believe that at least a mention of this with reference to sources, is appropriate. As always, I am open to providing contribution, albeit under you guidance.

Action; Harald to start chapter 1.2, 3D wellbore positioning then more detail in section 8

Adam and Nich to start with Azimuth, Inclination, continuous inclination and TVD uncertainty

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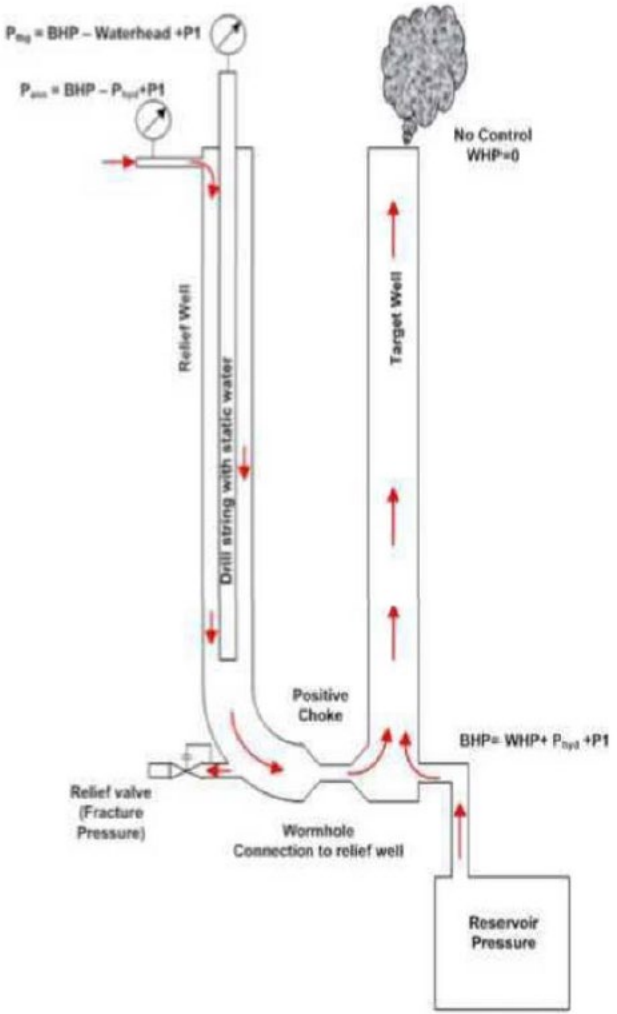
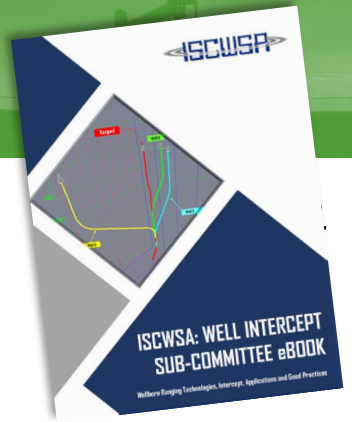
10. Section 9.4.1 includes a diagram that is n
figure out the text).

Action; Benny and Dan Morrell






Q&A